Quiz 8 (5 points total) Math 220, Matrices, Spring 2015

Name:

Problem 1 (2 points) Let $A = \begin{pmatrix} 1 & 2 & 3 \\ 0 & 4 & 5 \\ 0 & 0 & 6 \end{pmatrix}$. Compute $\det A$.

Problem 2 (3 points) Let $A = \begin{pmatrix} 1 & -1 & 2 \\ 2 & -2 & 4 \end{pmatrix}$. What does the rank theorem say about this matrix? In other words, how are $\text{rank}A$ and $\dim \text{Nul}A$ related?

Quiz 9 (5 points total) Math 220, Matrices, Spring 2015

Name:

Problem 1 (2 points) Let $A = \left(\begin{smallmatrix} 0 & 1 & 1 & 2 \\ 1 & 0 & 1 & 3 \\ 1 & 1 & 0 & 1 \\ 2 & 3 & 1 & 0 \end{smallmatrix}\right)$. (i) Compute $\det A$. (ii) Is A invertible?

Problem ? (3 points) (i) What aspects of the course have been good in terms of your learning? (ii) What aspects of the course could use improvement? (iii) Any other suggestions or comments?

Quiz 10 (5 points total) Math 220, Matrices, Spring 2015

Name:

Problem 1 (2 points) Let $A = \begin{pmatrix} -1 & 0 & 1 \\ -3 & 4 & 1 \\ 1 & 0 & 2 \end{pmatrix}$. Find the characteristic equation of A.

Problem 2 (3 points) Let $A = \begin{pmatrix} 1 & 0 \\ 0 & 1 \end{pmatrix}$. $\lambda = 1$ is the only eigenvalue of A. Find the dimension of the eigenspace corresponding to A.

Quiz 11 (5 points total) Math 220, Matrices, Spring 2015

Name:

Problem 1 (2 points) Let A be a 3×3 matrix, and $D = \left(\begin{smallmatrix} 3 & 0 & 0 \\ 0 & -1 & 0 \\ 0 & 0 & 2 \end{smallmatrix}\right)$. Suppose $A = PDP^{-1}$ for some invertible 3×3 matrix P. What is the characteristic polynomial of A?

Problem 2 (3 points) Let $A = \left(\begin{smallmatrix} 2 & 0 & -2 \\ 1 & 3 & 2 \\ 0 & 0 & 3 \end{smallmatrix}\right)$. The eigenvalues of A are 2 and 3. Is A diagonalizable?

Quiz 12 (5 points total) Math 220, Matrices, Spring 2015

Name:

Problem 1 (2 points) Let $W = \text{span}\left\{ \begin{pmatrix} 1 \\ 0 \\ 0 \end{pmatrix}, \begin{pmatrix} 0 \\ 1 \\ 0 \end{pmatrix} \right\}$. Find the orthogonal decomposition of $v = \begin{pmatrix} 0 \\ 0 \\ 1 \end{pmatrix}$ onto W. In other words, find vectors $\hat{v}$ and z such that $\hat{v}$ is a vector in W, z is a vector orthogonal to W, and $v = \hat{v} + z$.

Problem 2 (3 points) Let $A = \begin{pmatrix} 1 & 0 \\ 0 & 1 \end{pmatrix}$. $\lambda = 1$ is the only eigenvalue of A. The dimension of the eigenspace corresponding to $\lambda = 1$ is 2. Find an orthogonal basis of the eigenspace.

Quiz 13 (5 points total)

Name:

Problem 1 (5 points) Show that $A = \begin{pmatrix} 1 & -2 & 3 \\ 0 & -3 & 0 \\ 0 & 0 & 7 \end{pmatrix}$ is diagonalizable, but not orthogonally diagonalizable.